

AIR TURBINE STARTER HAVING A FORCE BALANCED, PRESSURE  
ENERGIZED, WEIGHTED CHECK VALVE

ABSTRACT OF THE DISCLOSURE

An air turbine starter is provided that includes a check valve assembly for placement between a first environment, at least a portion of which is at a first pressure ( $P_1$ ), and a second environment, at least a portion of which is at a second pressure ( $P_2$ ), wherein the difference between the first and second pressures generate a pressure force ( $F_p$ ). The check valve assembly comprises a valve element disposed between the valve seat and the valve body, the valve element capable of being acted upon by a gravitational force ( $F_w$ ), a viscous force of the fluid to be communicated between the gearbox assembly and the starter housing ( $F_v$ ), a buoyancy force of the valve element ( $F_b$ ), and the pressure force on the valve element ( $F_p$ ), the valve element further configured to translate axially to a closed position when  $P_2 < P_1$  and  $F_w < F_v + F_b + F_p$ .